

Winter 2000

THE MAINE SUN

NEWSLETTER of the Maine Solar Energy Association



Metering the Sun

By Richard Komp

One of the aphorisms floating around since the seventies is that large multinationals wouldn't be interested in using solar energy until they can figure out a way to meter the sun. Well Shell Oil seems to have figured out a way to do just that. In a news release Shell Renewable and ESKOM, South Africa's national electric utility, announced a new joint venture to bring photovoltaic electric power to remote villages in East Cape Province. In this part of the country, installing photovoltaic systems is much cheaper and more reliable than extending the utility grid, which is normally the case in remote areas in the Developing World. What is unusual about this project is the way the users are being charged for their solar electricity.

The individual PV modules have a microchip imbedded into the encapsulant behind the solar cells and an unusual two way cable connects the modules to the specially designed charge controller on the wall inside the peasant's small house. This charge controller has a touchpad similar to the one on a modern telephone; and once a month the peasant goes off to the local general store and pays his monthly fee to receive the next month's pass-number. Only when the proper number is typed into the touch pad will the PV module continue to deliver electricity to the storage battery in the house. The 50 watt systems are enough to run a few efficient fluorescent lights and a small black and white TV set, as well as a radio and are never actually owned by the peasant. Instead, as long as the monthly fee is paid, the Shell joint venture will repair and maintain the system, which continues to belong to the joint venture.

The payment schedule is geared to the extremely limited financial resources of these very poor people. After paying a \$30 deposit (in local currency) the peasant pays about \$8 per month for the electricity. This is calculated to be approximately what the household was paying per month for fuel for their kerosene lamps and candles. *(these numbers are quite close to what an Nicaraguan campesino pays per month for the same fossil fuels).* In other words, instead of going to the local store and buying \$8 worth of Shell kerosene or candles made from Shell paraffin, the peasant now goes and pays Shell's representative the same amount of money for electricity. Certainly there are many benefits from this exchange: The light from the fluorescent fixtures is far superior to the dim yellow illumination from the kerosene lamps; the noxious fumes of burning kerosene are eliminated; and the family gets to watch television. In addition, the 50 watt system, over its 25 year lifetime will eliminate 12 metric tonnes of CO₂ from the atmosphere *(see the Summer 2000 Maine Sun for a detailed calculation of this value).* However, a good portion of the money paid by the peasants for this service will leave the local economy and Shell's cash flow from the Third World area will probably stay the same after the transition.

The Grupo Fenix down in Nicaragua has also started to install similar sized systems with a similar financial plan, but with some significant differences. First, the entire system is actually

manufactured in Nicaragua and all the personnel involved in the project *(except myself, and I don't take any pay for the work)* are residents of Nicaragua. This means that all the money paid by the campesinos stays in the country. Second, the campesino actually owns the system and the money paid each month (after the \$40 "prima" or down-payment) goes to pay off a micro-loan. With a payment of \$10 per month, a 35 watt system is paid off in about 4 years. The first year's maintenance is covered *(I'm arguing to make this 4 years)* as part of the contract. The campesino will probably have to replace the storage battery after 5 years and pay for this over the next 8 months or so, but after that the payments stop even though the electricity continues to flow from the sun. What we have done to make the whole project valuable is, instead of embedding a microchip in the module, we have embedded a trained solar expert in each village. The latest of these installers, who also visit the campesinos to collect the money each month as well as take care of any problems with the systems, are former land mine victims who have been through the training program set up as part of our Land Mine Awareness Project, sponsored by the Canadian Governmental CIDA program. While coming nowhere close to equaling the 50,000 households Shell expects to include in its marketing program, we have been expanding this program in the northern areas of Nicaragua and have installed over 100 systems so far (although the majority of them have been community systems paid for by outside grant money and not involving the micro-loans). We have been talking with various groups about ways of financing many more of these micro-loans.

There appears to be a good chance that I will get to travel to East Cape Province in South Africa next April to give a hands on PV training workshop, so maybe I will get to check out "metering the sun" for myself. RK

Clinton proposes CO₂, mercury emission rules

US President Bill Clinton called for new rules to regulate carbon dioxide and mercury emissions from US electric power plants through a system of caps and trades, similar to the one in use for nitrogen oxide and sulfur dioxide. At the same time, Clinton asked for curbs on mercury emissions from power plants. Under the cap and trade system, the government would set national limits on emissions and divide pollution allowances among power plants. Clinton said an integrated strategy covering all four pollutants would provide planning certainty to the utility industry and reduce the cost of cutting the emissions on a pollutant-by-pollutant basis. This "four pollutant" approach would establish national emissions standards, or 'caps,' on sulfur dioxide, nitrogen oxide, mercury, and carbon dioxide.

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THE MAINE SUN

Newsletter of the Maine Solar
Energy Association

The Maine Sun is published four times a year by the Maine Solar Energy Association (ME.S.E.A.), a nonprofit organization (sister chapter to the North East Sustainable Energy Association.)

OUR MISSION:

We are dedicated to promoting the public awareness and use of:

- Solar Energy
- energy conservation
- other renewable nonpolluting energy sources.
- environmental and health awareness building practices throughout the state of Maine.

Opinions expressed by authors of editors do not necessarily reflect the views of ME.S.E.A. The publisher reserves the right to refuse advertising which is not consistent with the goals of this organization. Acceptance of advertising does not constitute endorsement of the advertiser, its products or services.

The Maine Sun welcomes submissions, articles, photographs, and letters. Please send editorial material to The Maine Sun Editor: Malcolm Sanders, RR 2, Box 56, Ellsworth ME 04605. Phone: 667-0040. Internet: mms@aretha.jax.org

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COMING EVENTS

Do-It-Yourself Solar Air Heating Primer & Workshop

Sponsored by the Maine DECD's Energy Conservation Office, the Maine Solar Energy Association, The Green Store, and Sol-Air Company; A FREE Course: **Do-It-Yourself Solar Air Heating** will be held in Belfast at The Green Store (71 Main St., Belfast, 338-4045) on Friday, Jan. 19 from 7 to 9 PM. The subject is "Solar Air Space Heating". The course will cover solar principles, and the site requirements, sizing, construction, and operating characteristics of air-type solar collectors.

A follow-up hands-on workshop, also FREE, will be held the next day—Saturday, January 20—from 8 AM 'til 2 PM, at Sol-Air Company (129 Miller St., Belfast, 338-9513). The instructor is Bill Kreamer, owner of Sol-Air Company, Belfast, builder of space heating solar systems. Bill received the DOE's Award For Energy Innovation in 1984 and 1985 and has been building air-heating solar collectors for 17 years. At the Saturday workshop, participants will build a low-cost fan-powered air heating solar collector with an efficient filament-matrix absorber, suitable for mounting on the wall or window of a building. The workshop-built collector will be for sale at the end of the workshops for the price of materials, about \$140, but you won't have to purchase anything to attend. We will pool funds and send out for lunch and refreshments.

For more information or to pre-register (recommended), call The Green Store, 207-338-4045, <http://www.greenstore.com> or Sol-Air Company, 207-338-9513.

NESEA Building Energy 2001

Tufts University March 21-24, 2001.

Join us for spring break at Tufts for four intensive days of networking, sharing and learning. Building Energy is the premier conference that brings together experts in the fields of renewable energy and green building.

Focusing on practical solutions to such important issues as electricity deregulation, rising energy prices, sustainable building practices and healthy, quality construction, Building Energy 2001 is a unique conference that addresses some of the most fundamental sustainability issues. Featuring two workshop days and two full conference days with lunchtime tours, an interactive trade show and a public slide show this is an event not to be missed. Building Energy is a professional conference bringing together the worlds of Renewable Energy and High-Performance, Green Building. Building Energy is comprised of two conferences that once happened separately; the Quality Building Council conference and the RENEW conference.

For More information on the conference or to be included on our mailing list please contact Jonathan Tauer, Buildings Program Manager at jtauer@nesea.org or (413)774-6051 ext #20.

Photovoltaics Workshop at Building Energy 2001

As part of the Building Energy 2001 Conference, Richard Komp will give an all day workshop Saturday, March 24th. Dr. Komp will discuss the manufacture and workings of solar cells as well as overview the sizing of photovoltaic systems including batteries, inverters and charge controllers. In addition, photovoltaic modules will be assembled from individual solar cells. These modules will include solar battery chargers that participants will be able to take home for a cost of \$16, to pay for the parts. It will be possible to assemble larger pv modules to run radios or other remote devices, but it is not necessary to take home a solar charger to attend the workshop. We will also discuss and show photos of Richard's work with Grupo Fenix, teaching landmine victims how to manufacture and install photovoltaic systems and solar cookers in Nicaragua.



MAINE COUNCIL OF CHURCHES GLOBAL WARMING CONFERENCE

By Robert Birk

Religious leaders return home to educate others in their congregations and community about the impacts of global warming and the common sense actions they can take to address the problem. Local lay leaders from Knox County joined with other leaders from across the State in attending the Maine Council of Churches' global warming training conference entitled, Maine Interfaith Climate Change Initiative for Faith Communities: Creating Cool Congregations in a Warming World. Nearly 70 religious and lay leaders representing Maine's varied faith communities attended the Conference held October 1 and 2 at Camp Mechuwana in Winthrop, Maine.

"Global warming is a complex environmental problem and it will take a global solution to solve," said Bob Birk of Washington. "The Conference was an opportunity to learn more about accelerated climate change and how to take actions in our own communities." Attending the Conference from Knox County were Birk, his daughter Eva, Anne Parent and Katie Houghton, both of Warren. All four were representing the Peoples' United Methodist Church in Union. Also attending were Judith Schmidt (Church of Christ Scientist affiliation) from Washington, and Carmen Levertu with the Religious Society of Friends-Quakers from Thomaston.

Over a dozen well-known speakers shared information about climate change, environmental stewardship and community education at the two-day event. Speakers included Dr. John E. Carroll, Professor of Environmental Conservation at UNH; Dr. George L. Jacobson, Jr., Director of Quaternary Studies, U. Maine-Orono; James Connors, Maine State Planning Office; Joan Saxe, Sierra Club; Rabbi Ruth Smith, Reverend Jean Alexander, and Sister Frances Thomas.

Workshops offered included: Practical Ways Everyone Can Reduce Fossil Fuel Energy Use; Green Power-Why Maine People of Faith Are Joining Together to Buy It; Education Strategies for Sharing Information About Global Warming; Organizing Denominations and Individual Congregations to Address Climate Change. A small youth group was also represented. Conference attendees also got the chance to view displays of alternative energy technology, hybrid powered cars, books and resources from faith-based organizations and publishing houses focused on climate change and environmental stewardship.

During the conference, a global warming statement was released signed by 20 religious leaders that calls for Maine's faithful to join with leaders in becoming more knowledgeable about the science and economic impacts of global warming, and to take actions in their personal lives, in their congregations, and in their communities to reduce their greenhouse gas emissions.

TAKING IT HOME

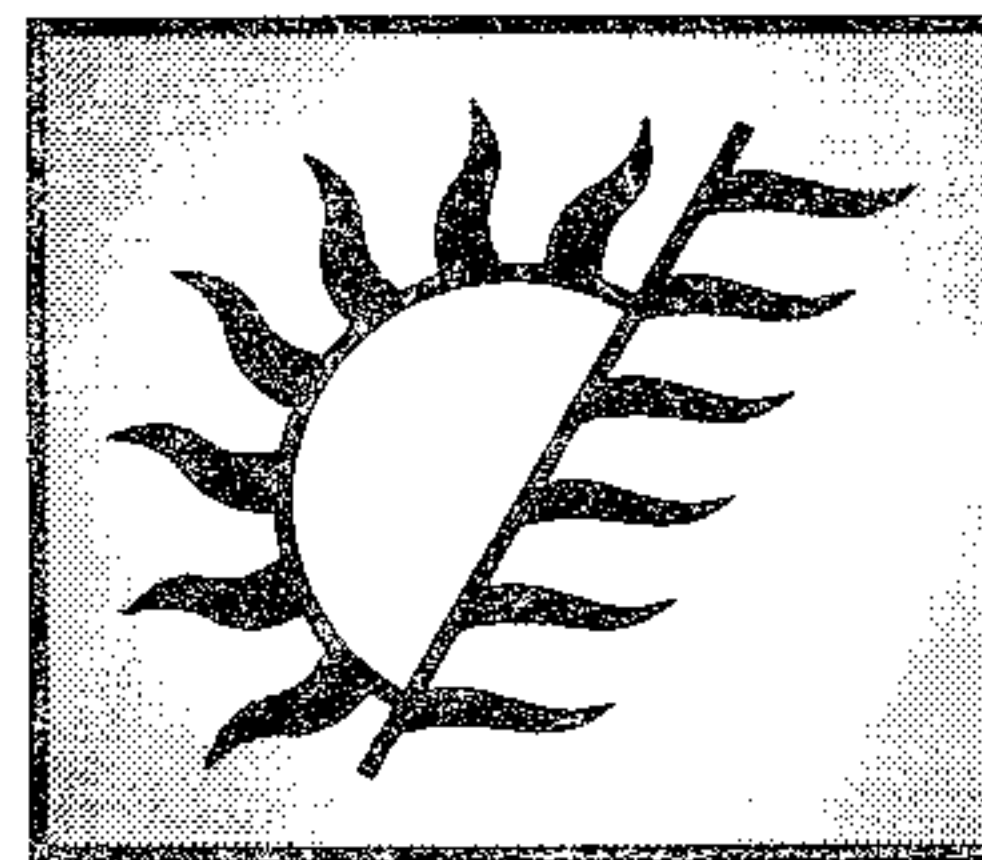
Doing our part to reduce global warming begins at home," said Anne Parent of Warren. "Over the weeks and months ahead we will share what we have learned at the training conference

with members of our congregations and community." Local leaders will participate in the Maine Council of Churches' Interfaith Climate Change Initiative inviting their community to join together in a pledge drive to reduce greenhouse gas emissions. The "Family Savings Plan" launches a campaign for Maine's faith community to meet the US obligations under the Kyoto Protocol.

Local churches will also begin to consider their long-term involvement in establishing a green sanctuary, which is referred to as Creating a cool congregation in a warming world. This may begin as simply as replacing some standard light bulbs with energy conserving compact fluorescent bulbs. There will also be an opportunity for individuals and the place of worship proper to consider purchasing green power, that which is produced in the most environmentally benign manner.

GETTING INVOLVED AT YOUR PLACE OF WORSHIP

For more information on how clergy, lay leaders and youth group mentors in your place of worship can get involved with the program call Nancy Chandler at 3389-1565 or Bob Birk at 845-2625. The Maine Interfaith Climate Change Initiative is a project of the Maine Council of Churches' Spirituality and Earth.



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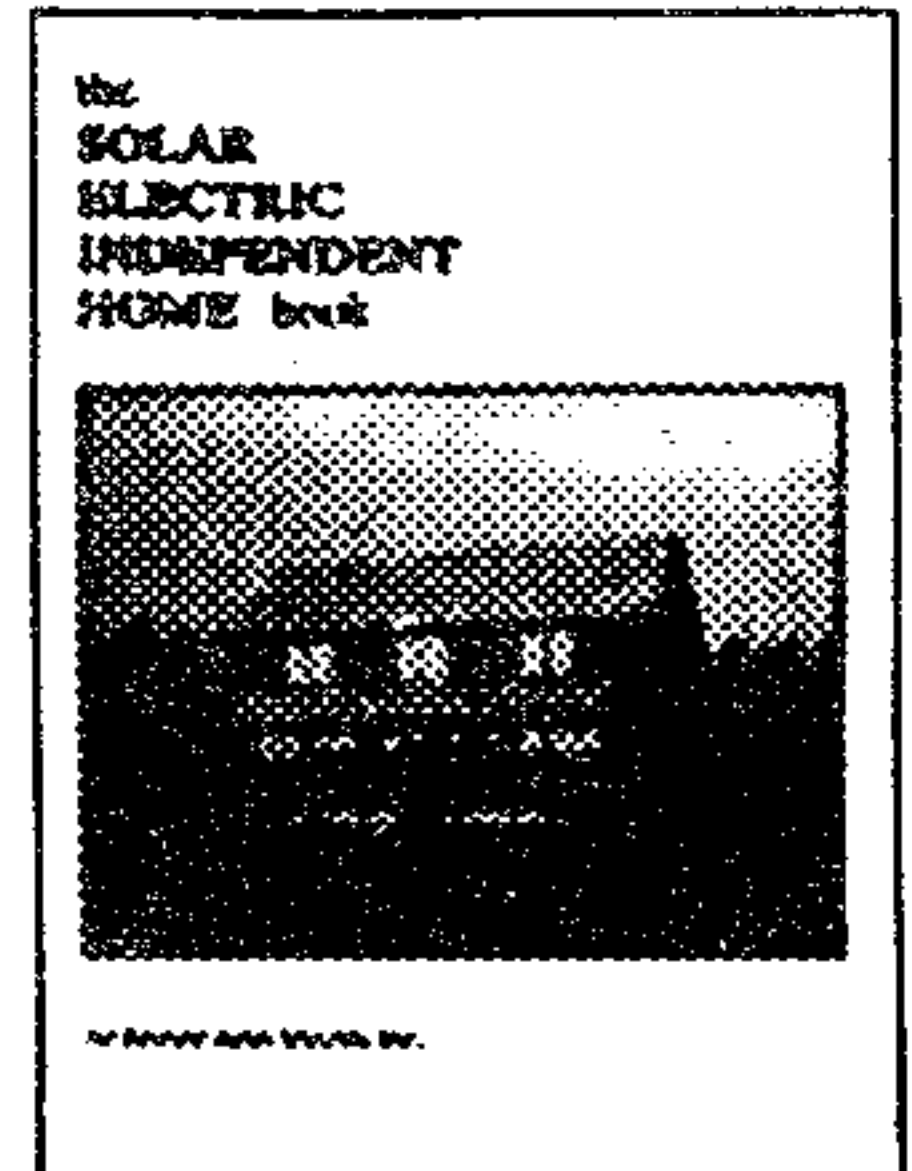
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Workshop Reports

Solar Water Heater Workshop in Stockton Springs

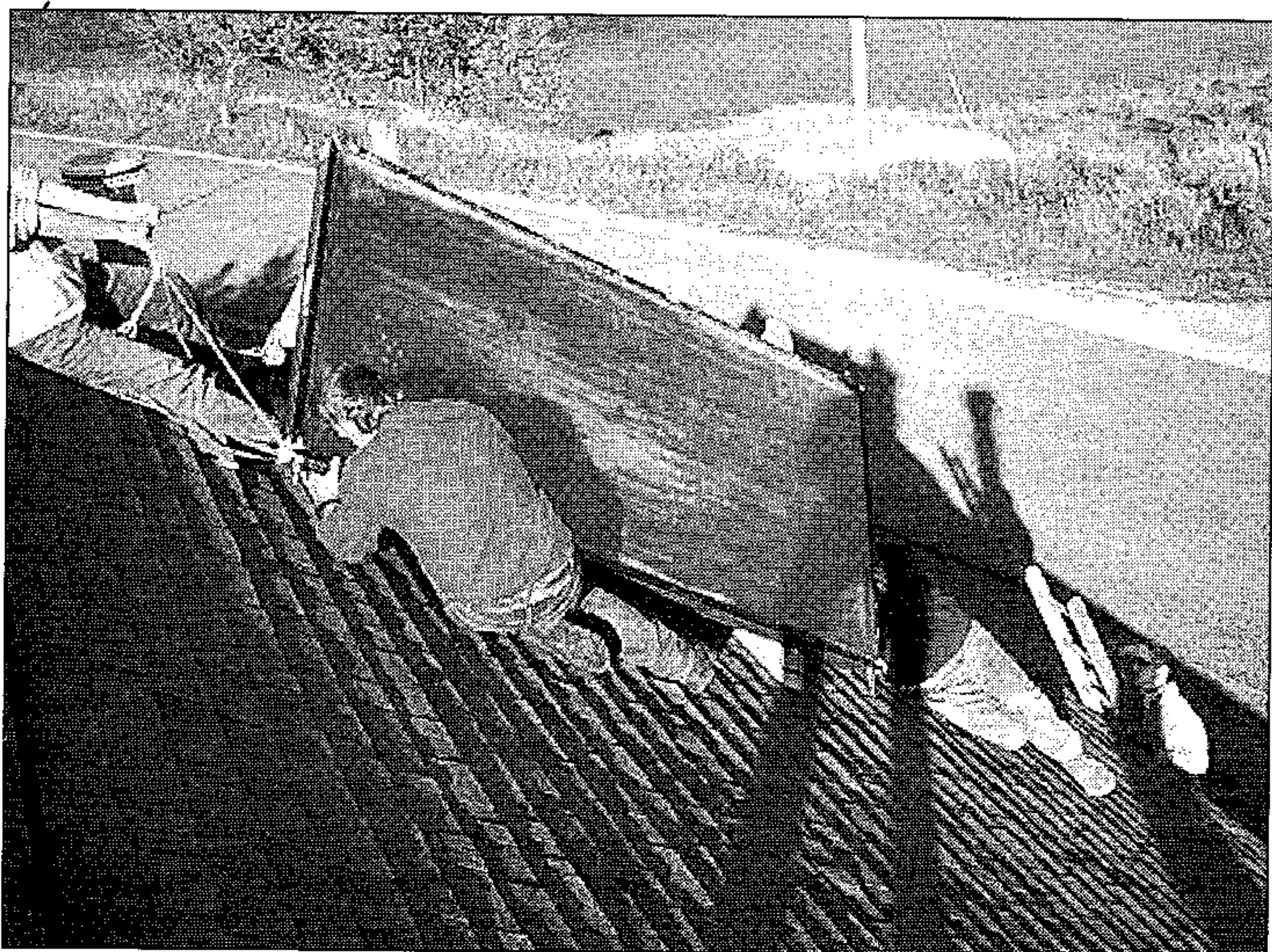
By Richard Komp

On the last weekend of September, MESEA had a relatively successful solar water heater installation workshop in Stockton Springs at the home of MESEA treasurer, Carol Kinsey. On Friday evening, we had a free talk on solar thermal systems at the Green Store which was attended by a half dozen very interested and interesting people. The informal talk led to a free ranging discussion by people who have been working on solar thermal systems for many years. One participant came all the way from Long Island in New York to attend the weekend event.

On Saturday morning, the seven workshop participants disassembled an old, used solar water heater collector and found nothing really wrong in spite of the 25 years the collector had been outdoors. We repaired the damaged corners of the case and tested the absorber plate but found no leaks. One team snaked the plumbing runs through Carol's house from the attic through to the basement, hiding the copper tubing in closets and such to make the installation as neat as possible, installing the pv powered circulating pump on the heat exchanger and the other small parts needed for a closed loop system. The other team built and installed the special roof racks needed to hold the collector on a roof that was sloping southeast. The racks neatly nestles the collector parallel to the roof but tipped southwest so the final result is south (even though it doesn't look so). Finally, in mid-afternoon, we installed the collector and finished connecting up the plumbing. When we filled the system with the water/propylene glycol antifreeze mixture, we discovered there was now a big leak somewhere in the absorber plate. Since the sun was setting by now, we finished the workshop.

A couple of weeks later Charles Ewing of SEADS and I came back and, with help from others, removed and dismantled the collector, discovered the leak (which was a cracked braised joint in the manifold, probably defective and weak from the beginning) and repaired the bad joint. We also had to switch to a larger PV module to increase the flow rate of the pump.

Below: Installing the solar collector on the roof.



Photovoltaic Workshops in Honduras

By Richard Komp

In late October, I helped give a set of solar workshops in Honduras. This came about as a result of spreading reputation of the Grupo Fenix in Nicaragua and the impressive work the group is doing in solar energy. A USAID administrator in Washington has become very interested in our work and arranged funding for two people from the CARE International office in Honduras to attend the Solar/Cultural Course in Nicaragua (*see the Fall 2000 Maine Sun for a description of the course*). He also arranged funding for a week long visit and workshop in a remote area of Honduras.

After the funding had been approved, Becky and Raul, the CARE administrators and I rearranged the spending priorities. We eliminated the hotel fees, and other expensive travel items and arranged for the bulk of the money to be spent on 6 photovoltaic systems and 3 large solar box cookers. We also arranged for 9 Nicaraguans (7 from Fenix and 2 from Girasoles, the solar cooker workshop center) to come up to give the workshops and take part in the subsequent solar conference in Tegucigalpa (the capitol of Honduras). All this staying inside the original budget total of \$15,000.

After an interesting flight into Tegucigalpa on the 23rd of October (*Tegucigalpa, at over 3,00 feet and surrounded by mountains, is considered one of the most dangerous airports in the world with its single short runway*) I was met by CARE personnel and introduced to the city and the CARE office. The next day we went to an extremely remote area of La Paz province where CARE has been working with a set of isolated villages. We drove on a newly completed road that was totally made by hand (*The campesinos did the work in exchange for food relief after Hurricane Mitch*). The very narrow road hugs the side of the mountains and has spectacular views. I got to look down into deep ravines with no annoying guard rails to block the view. When we arrived at Delicias, the village where the first part of the workshop was to take place, no Fenix people had arrived yet and no word was forthcoming as their whereabouts. By now it was dark so we were served supper and went to sleep in the local health care center.

The next morning, we found out by radio that the two trucks with the Fenix people and all the parts for the PV and solar cooker workshops had been held up at the Nicaraguan/Honduran border for 9 hours for lack of a single piece of paperwork, which was finally found and faxed to the border, and that they would finally arrive later in the morning. In the meantime, there was a whole crowd of campesinos waiting for the workshop to start. Fortunately, I had a batch of solar cells and other parts in my suitcase so I started giving the workshop in Spanish, since nobody there spoke any English at all to do any translating. Now, I have never formally studied Spanish so the two hour workshop session pushed my limited ability in the language to the maximum, but fortunately Ethyl, the administrator of Terrasol's Honduras affiliate who was attending the workshop, could expand on my explanations of how solar cells work in order to make the concepts clearer to the campesinos, who



hadn't been exposed to solid state physics before. Finally, about 10:30 as we were taking our morning coffee break, the trucks with the Grupo Fenix and Girasoles people arrived. We all moved on to the next village for the next part of the workshop where the Fenix former land mine victims took over and demonstrated the new 50 watt PV modules made in Nicaragua as well as the two already assembled solar box cookers. (see photos below)

After lunch, the 50 or so workshop participants split up into three groups. One group started building small solar box cookers, made from cardboard file boxes we scrounged from the CARE office while a second group started assembling a third large solar box cooker from wooden parts and used aluminum printing plates precut in Nicaragua. The third group installed a 50 watt PV system on a new health clinic under construction. I actually don't have to teach these workshops anymore since the former landmine victims do such a great job of showing how the installations are done. Instead I ended up surrounded by all the school kids who wanted me to explain how everything worked. When Mauro (*one of the landmine people*) tried to take my place to explain in his perfect Spanish, they told him they wanted me to do it so I can only assume they found my fractured Spanish amusing.

We had originally planned to install three 100 watt PV systems but Raul Iglesias, the CARE administrator for the program, decided to split up the systems and install five 50 watt systems instead, leaving one system to be put in later in a new CARE field headquarters. Therefore, the next day we split up the parts and tools and formed two PV installation teams to work in widely separated locations. Mauro and I went off with one group to Santa Rosita, about 15 Km away to install systems there and in Delicias while Jose Luis went with another group 10 Km the other way to do two different installations. In all, we wired up four health clinics and one school for solar electricity. I also heard that I missed a spectacularly good solar lunch cooked by the other teams in the newly finished solar cookers.

Of course the workshops didn't go perfectly smoothly; we had our problems. On the way to Santa Rosita, the jouncing over the terribly rocky road somehow cracked the glass on one PV module and gave the four wheel drive truck a flat tire. While Raul and I changed the tire (*I was the only one with enough heft to break loose the lug nuts, gringo weight is useful sometimes*)

Installing a 50 watt PV module on a health center roof.



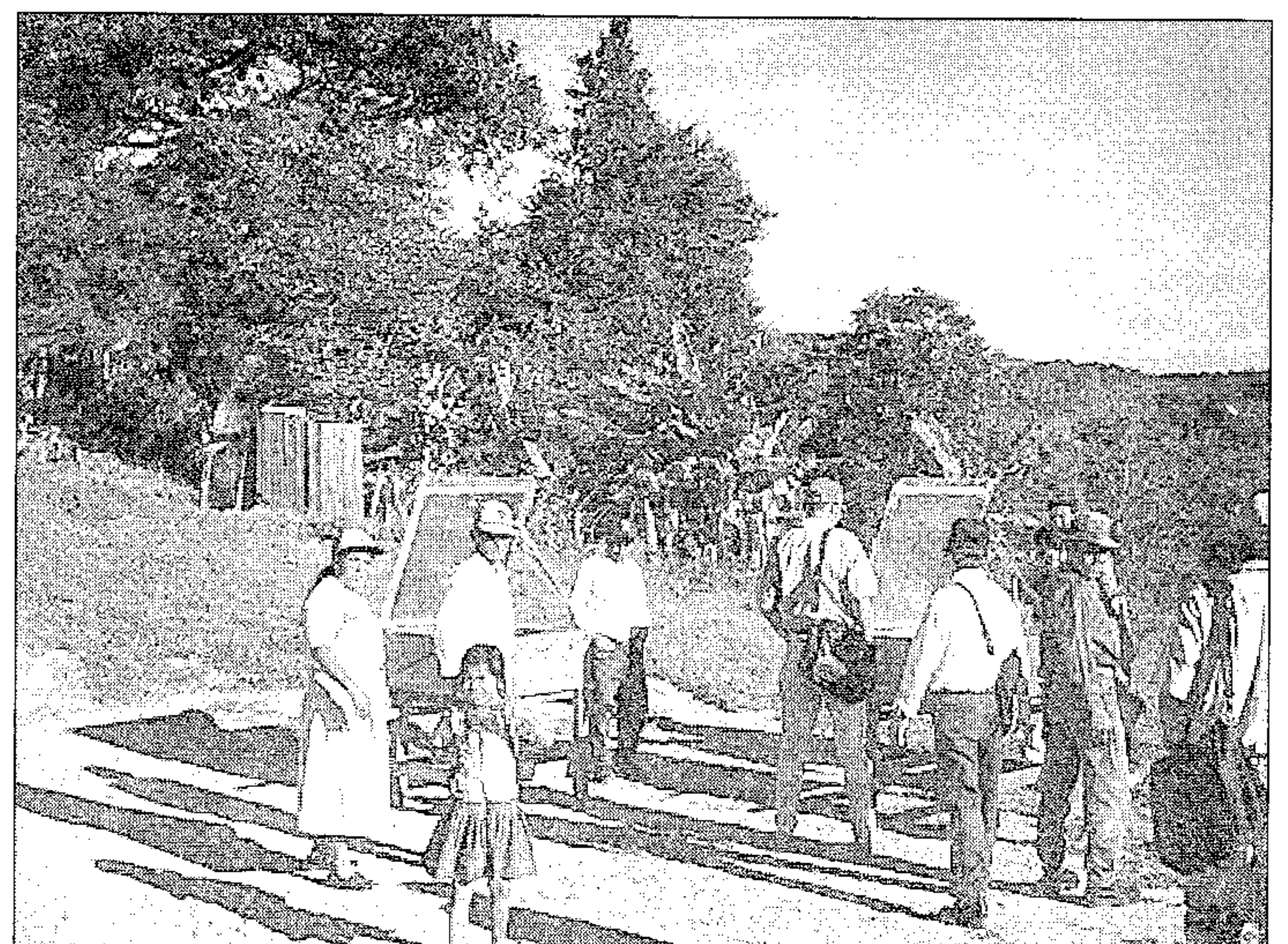
Mauro was busy giving a PV lecture and sales pitch to the campesinos who filled the back of the truck. While Raul went off to get the tire fixed, Mauro and I gave the PV installation workshop, wiring up the health care clinic and doing everything but installing the broken PV module, which Mauro and a team replaced the next morning. That afternoon, we installed the system in the Delicias health care clinic where I had been sleeping. I fell through the roof of the clinic when the group asked me to climb up and check the slope of the PV module before they bolted it down. The roof was made out of some sort of asbestos/concrete material which wasn't supported well enough for thinness of the material. (*The Central Americans are smaller people and had no problems walking on the roof but gringo weight is a problem sometimes.*) The health care doctor seemed amazingly non-plussed by me crashing through his ceiling and leaving a large Richard Komp shaped hole in his roof. We moved the roof panels around to make the hole over the porch where it wouldn't matter in a rainstorm and I put back the ceiling panels so no damage was evident from inside the building. Fortunately, I didn't fall completely through to the floor and only ended up scraping a leg. Handy having a doctor right there.

Jose Luis had better luck (*or maybe he was more careful*) and finished his two installations without any problems; although the next day, which was a maintenance and troubleshooting workshop, we discovered that one of the fluorescent lamps in the school wasn't working quite right so we swapped out the ballast as the first of the lessons in troubleshooting.

I went back to Tegucigalpa early to work on the upcoming conference, as well as to contact Susan by e-mail so she could bring a replacement 50 watt PV module and extra charge controllers with her on the bus (*everybody but me traveling by bus is one of the ways we ended up with money ahead to accomplish so much*). Every part used in the installations was made in Nicaragua so the cracked PV module and bad fluorescent ballast went back to be rebuilt.

The conference, which grew out of the suggestion of mine that it would be good for Fenix and me to meet the solar practitioners in Honduras, was a complete success. We had about 35 attendees, including people from USAID and Terrasol, the Boston based group who has installed thousands of PV systems in the Caribbean and is now working in Honduras.

The Girasoles solar box cookers in operation at the workshop.



1876 - James Clerk Maxwell on Solar Cells

by Richard J. Komp

The following is a discussion by the eminent 19th century scientist, James Clerk Maxwell on the newly discovered amorphous selenium solar cell. William Groves Adams, one of the discoverers of the photovoltaic effect in selenium had left a set of notebooks in Truro, the county seat of Cornwall, in Great Britain. When John Perlin was working on his new book, From Space to Earth - The Story of Solar Electricity, he asked Mirdza (my ex-wife) to look through these notebooks in the basement of the county courthouse. Between them, they came up with a copy of this handwritten letter from Maxwell to Stokes, who was working on the editorial staff of the Transactions of the Royal Society and who had asked for help understanding this strange new phenomena. This letter has never been published before and I think it gives some insight into how Maxwell (the creator of the ultimate synthesis of classical understanding of the relationship between light, electricity and magnetism in his famous four electromagnetic equations) looked at an interaction between light and solid surfaces which cannot be explained by this classical physics. In fact, the explanation twenty five years later of the photoemission of electrons from metal (a related phenomenon) is what won the Nobel Prize for Einstein (rather than his work on Relativity, which the Nobel prize committee thought was still too radical). By the way, John Perlin's book has become very popular and is available from **aatec Publications**, which is also my publisher.

11 Servape (?) Terrace

31 Oct 1876

pr 7.

Dear Professor Stokes

I have read the paper by Prof. W G. Adams and Mr. Day, and also the reports of Prof. Roscoe & G. C. Foster. I agree in many points with the report of Prof. Foster and I think it contains valuable suggestions for filling up deficiencies in the paper. At the same time I consider the paper itself a very valuable contribution to the theoretical science. Although it is not a complete investigation of all the phenomena described, it makes known the existence of this phenomenon.

With respect to the distinction between ordinary resistance and pulverization resistance we must bear in mind that all that we can ascertain about the electrical contribution of a linear conductor is

(1st) the difference of the potentials of its electrodes

(2nd) the strength of the current flowing through it.

In an ordinary metallic conduction (1) is proportional to (2) by Ohm's law.

In many other cases however this is not the case & in metallic thermoelectric circuits the thermoelectromotive force is superimposed on the other electromotive forces in the circuit. In certain other conductors the electromotive force depends not only on the strength of the current and on the distribution of temperature but on the previous history of the conductor, and in particular on the currents which have been passed through it already.

These phenomena are provisionally called phenomena of polarization. In electrolyte polarization this phenomenon is accounted for by a deposit of certain substances on the

electrodes, but similar phenomena occur in cases in which no such deposit has yet been discovered.

In this paper the existence of an electromotive force in selenium depending on previous currents through it is already established. The complete investigation of the laws of polarization even in such familiar examples as that of platinum plates in water, as in the Daniells cell, has long been a desideration (?) but the difficulty of the research is admitted by all who have tried it so that the incompleteness of the paper in this respect leaves it in very good company.

It would be very desirable, however the authors would determine the thermoelectric properties of the very pieces of selenium with platinum electrodes which they have used, by actually raising the temperature of one junction above that of the other. This would be better than quoting from the experiments of others on other samples of selenium and platinum.

I think that this would make the paper quite worthy of a place in the Transactions.

J. Clerk Maxwell

I have noticed one or two other points in which I think the paper might improved.

In p. 1 and elsewhere the possible causes of certain effects are stated to be Radiant Heat, Light, or chemical action. I think a better division would be,

- (1) Change of Temperature (of the selenium which is the same thing in itself whether produced by radiation or by conduction from a warm bath)
- (2) Radiation and if the incident radiation be the cause, determine whether those of long or of short period are most powerful and if the luminous radiation is the most powerful, specify the effect of various colored rays.
- (3) Is the radiation the immediate cause or does it act by producing some change in the chemical state of the substance, and is the change temporary or permanent?

At P. 3 the increase of resistance is attributed to the heating effect of the current, whereas it is afterwards proved to be due to polarization and besides the heat generated by 20 Leelanchi cells in a conductor whose resistance is a megohm is very small indeed. In most cases by far the greater part of the current did not pass through the selenium, but passed through two smaller resistances.

With respect to the speculation on p.43, we know that selenium is easily changed in its properties and in particular that the change produced by annealing (which we suppose to be crystallization) diminishes the resistance and this may be rendering the substance temporally more crystalline.

The incidence of light also excites an electromotive force in a certain direction. In order to do so there must be some difference in the substance from point to point at the place where the light falls e.g. we may pass from selenium to platinum, or from more crystalline to less crystalline selenium, but in any case there must be something to determine the direction of the force, and the paper gives a good way towards doing so.

It would be desirable that the word "selenium" or "substance" should be used rather than the word "metal" to distinguish the selenium from the platinum electrodes.

J. C. M.



Maine Solar Energy Association Membership Drive

Although things have improved since last June, The Maine Solar Energy Association is still struggling financially. We had just about enough money in our treasury to produce and print this issue of the Maine Sun. Although the money from advertisements and a small State grant for our workshops will replace some of the funds, we need to build up our membership base in order to continue.

As you can see in the Maine Sun in your hands, we have some exciting events planned for the next couple of months, including several workshops in Maine and the surrounding area. We also are very active working with other environmental and renewable energy groups, taking part in conferences and events like the MOFGA Common Ground Fair. While MESEA is an all volunteer organization with no salaried personnel, we do have travel and other expenses in connection with our active schedule; and we don't wish to curtail these activities.

You can help by joining us or renewing your membership promptly, using the membership application below. You may also wish to talk to others you know who might benefit by joining our MESEA. We will continue to educate people about solar and renewable energy and you will have done your part to help. Of course, if you wish to do more, please contact us about opportunities to volunteer in our activities (You can also donate extra money, of course.) Thanks for your help in this effort.

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Announcing...

The Maine Solar Primer

a compilation of
practical information and diagrams
from past issues of
THE MAINE SUN

The Maine Solar Energy Association has published a sourcebook for solar- and other alternative-energy resources in Maine. This booklet includes:

- Maine and nearby vendors of PV, solar thermal and other renewable independent power systems equipment
- Plans for building your own solar oven from a MESEA solar oven building workshop.
- MESEA workshop plans for building a rooftop solar hot water heater, appropriate for use in our climate.
- Includes information sections on passive solar architecture and photovoltaics.
- Drawings for building a solar-heated hot air food dehydrator.
- A list of books, periodicals, and organizations that can help you learn more about constructing renewable energy systems for your home.

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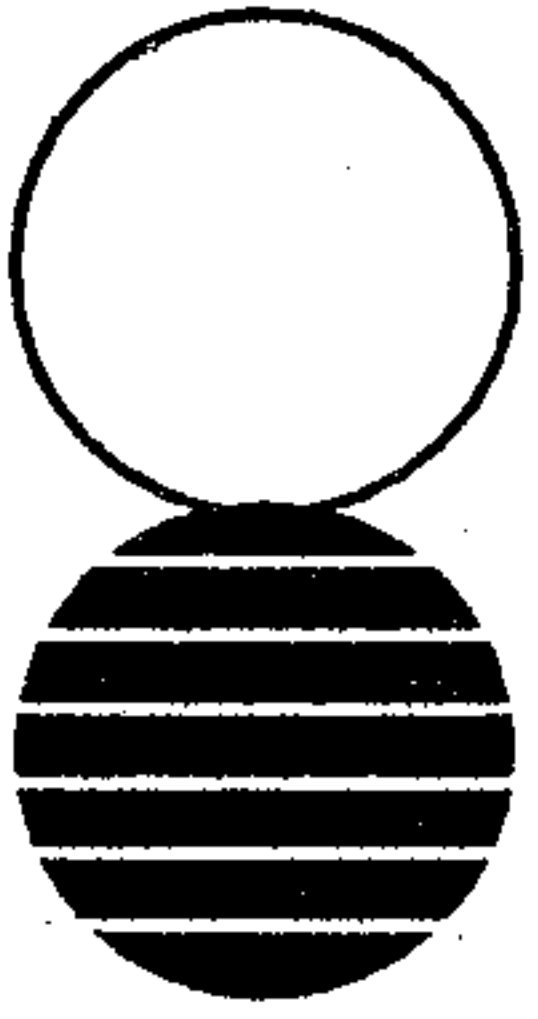
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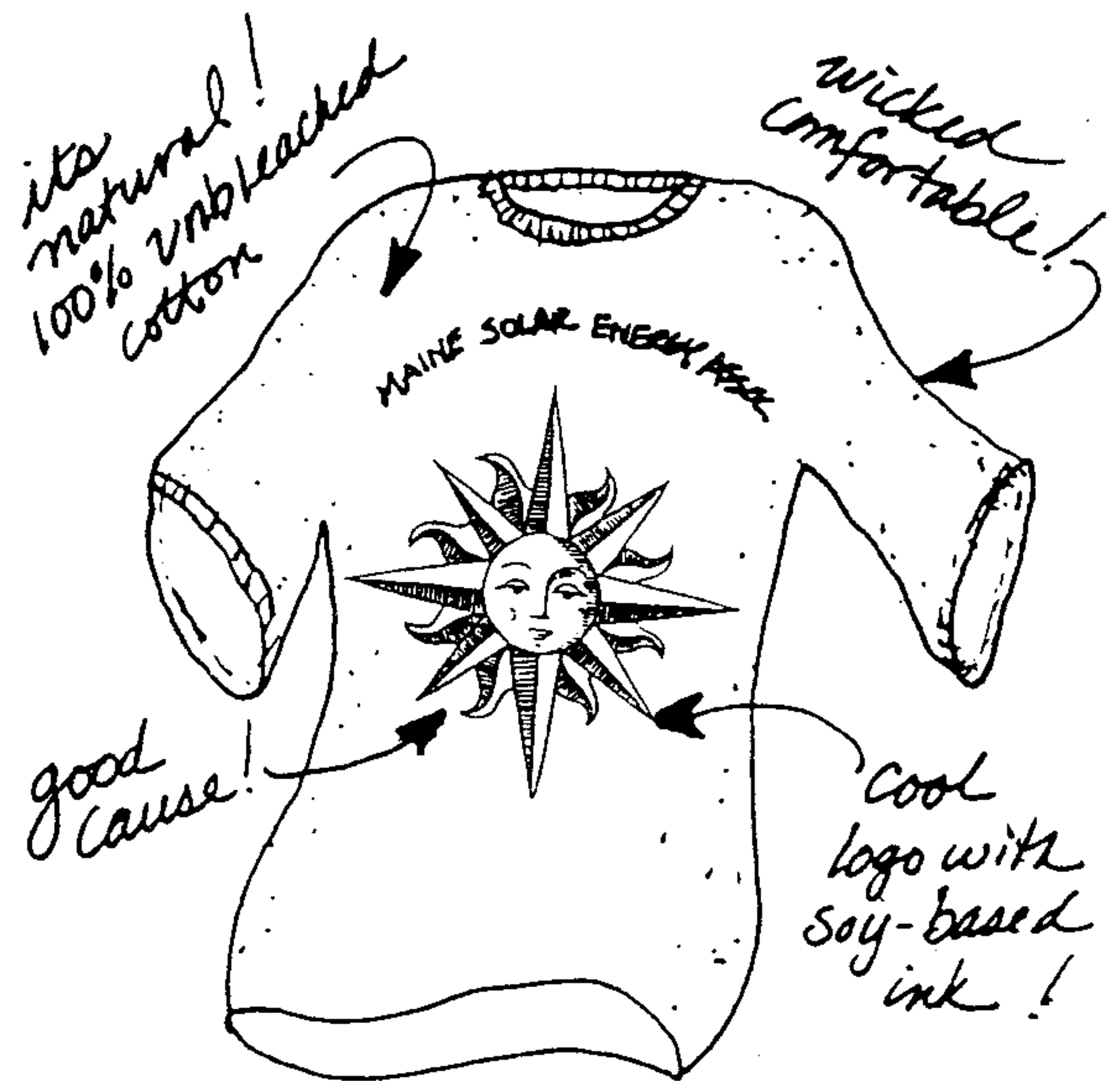
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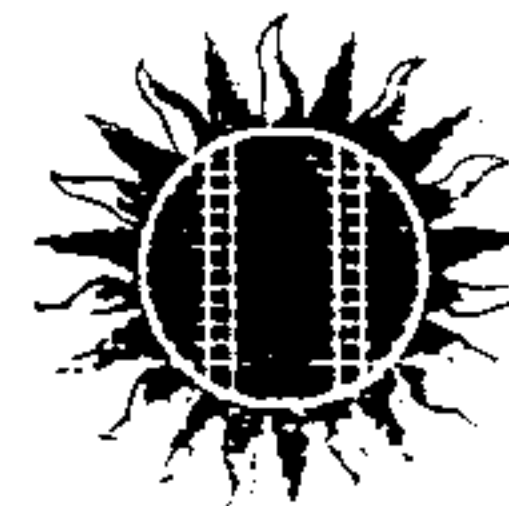
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